

REMARKS

The Examiner's careful review and examination of the subject application are noted and appreciated. Upon entry of the present amendment, claim 21 has been amended. Please note that all paragraph number citations to the original specification refer numbers as they appear in United States Publication Number 2005/0123469.

Rejection of claims 21-38, 40-45 under 35 U.S.C. 112

Claim 21 is entirely supported by the original specification and original claims.

Support for the amended steps of the amended claim 21 can be found as follows:

Claim 21 (Bold Text) - A process for converting bulk nickel metal to nickel sulfate comprising the steps of:

1) providing a bulk nickel metal to a system having at least one enclosed reactor column;

Support for step 1 can be found in paragraph 1 of the original specification, "the present invention involves dissolving nickel metal in sulfuric acid and introducing oxygen into the system to create a reaction in which a nickel sulfate solution is produced," and in paragraph 18 of the original specification "oxygen containing gas may be added to the system after the sulfuric acid has been added to the reactor(s) to dissolve the nickel, to achieve the same reaction above."

2) supplying sulfuric acid at a first pressure to the system,

Support for the first part of step 2 can be found in paragraph 19 of the original specification "after the sulfuric acid has been added to the reactor(s) to dissolve the nickel, to achieve the same reaction above," and in paragraph 20 of the original

specification "the present invention discloses a process for the production of nickel hydroxide comprising providing at least one enclosed reactor, preferably a reactor column, containing nickel then introducing sulfuric acid at a first pressure (about 10 psi to about 149 psi) into the enclosed reactor column(s) to dissolve the nickel to produce a solution."

said first pressure exceeding ambient pressure,

Support for the second part of step 2 can be found in paragraph 18 of the original specification "preferably, the sulfuric acid is introduced at a pressure above ambient pressure to facilitate the reaction" and in paragraph 39 of the original specification, "the pressure of the sulfuric acid introduced into the system may be in the range of about 10 psi to about 149 psi."

said sulfuric acid having a concentration sufficient to dissolve said bulk nickel metal;

Support for the third part of step 2 can be found in paragraph 40 of the original specification "the concentration of the sulfuric acid should be sufficient to dissolve the nickel and promote the chemical reaction above" and in paragraph 39 of the original specification, "the preferred pressure of the sulfuric acid may be in the range of about 11 psi to about 150 psi, because the higher pressure reduces the time necessary for the process."

3) supplying an oxygen containing gas at a second pressure to the system, said second pressure exceeding said first pressure, said supplying oxygen step producing a nickel sulfate solution;

Support for step 3 can be found in paragraph 18 "oxygen containing gas is introduced into a sulfuric acid flow, preferably at a pressure above the pressure of sulfuric acid solution" and in paragraph 40 of the original specification "the pressure of the oxygen containing gas-introduced into the system is preferably greater than the pressure of the sulfuric acid to promote the desired chemical reaction. A more preferred pressure of the oxygen containing gas is at least 2 psi greater than the working pressure of the sulfuric acid solution circulating through the reactor."

Applicants respectfully submit that claim 21 and all claims dependant thereon are fully supported by the original specification. Thus, removal of the rejection under 35 USC 112 is respectfully requested.

Claim Rejection of claims 21-38, 40-43 under 35 USC 103(a) over United States Patent 1,936,829 (Corson)

Applicants' amended claim 21 teaches supplying sulfuric acid at a first pressure exceeding ambient pressure. Corson does not teach or suggest this limitation.

The Examiner has stated "the sulfuric acid pressure is ambient which may not overlap that instantly claimed but is close enough that one skilled in the art would expect similar results." However, Applicants' claimed invention is not to a process that produces similar results to the process described in Corson.

Corson teaches adding Monel, sulfuric acid, and water to a steel cylinder, to form a mixture and subsequently adding compressed air and steam to the mixture. (See

Corson page 1, lines 76-109 and page 2, lines 18 -40) Corson contains no teachings directed to supplying sulfuric acid at a pressure exceeding ambient pressure and supplying oxygen at a pressure exceeding the pressure at which sulfuric acid is supplied as required by Applicants' claim 21.

A process having the Applicants' claimed sulfuric acid pressure level and oxygen pressure level relative to sulfuric acid pressure level has several advantages over the process of Corson.

Sulfuric acid introduced into the system at a pressure higher than ambient pressure is more reactive than sulfuric acid at ambient pressure. Therefore, the reaction between sulfuric acid and nickel occurs at higher reaction rates than sulfuric acid at ambient temperature. Further, since the sulfuric acid is introduced into the system at pressure levels higher than ambient pressure, the sulfuric acid can flow continuously through the system without being subjected to large pressure increases and pressure drops, thereby allowing the system to operate while efficiently utilizing a continuous flow of sulfuric acid.

By introducing oxygen into the system at a pressure level higher than the sulfuric acid pressure level, more oxygen can be introduced into the system. Further, the higher pressure level of oxygen relative to sulfuric acid pressure increases the rate at which oxygen can be dispersed within the sulfuric acid solution and increases the solubility of oxygen in the sulfuric acid solution. By increasing a dispersion and solubility level of oxygen gas in the sulfuric acid solution, Applicants' claimed process prevents hydrogen formation.

As described in the Applicants' original specification, current processes for making nickel sulfate produce both nickel sulfate liquid and hydrogen gas, the hydrogen gas creating a hazardous environment (see page 2, paragraphs 15-17 and equation 3). Applicants' claimed method of producing nickel sulfate does not generate detectable levels of hydrogen gas.

Corson teaches a batch process for forming nickel sulfate. Without the pressure limitations as claimed by Applicants, the process in Corson will likely produce hydrogen along with nickel sulfate. Corson is not concerned with hydrogen gas because Corson teaches a batch process having a reactor that is likely purged between each reaction cycle. Applicants teach an efficient method of forming nickel hydroxide where the hydrogen is not formed. This process can be implemented in efficient nickel sulfate forming processes, for example processes in which sulfuric acid is continuously cycled through the system. Thus, Applicants' claimed invention would not produce similar results to the teachings of Corson.

Since Corson does not teach or suggest Applicants' required limitation of supplying sulfuric acid at a first pressure exceeding ambient pressure and since the knowledge of one of ordinary skill in the art would not lead one to modify Corson in the way claimed by Applicants, Applicants' claimed invention is nonobvious over Corson.

Thus, reconsideration and removal of the rejection under 35 USC 103(a) is respectfully requested.

Claim Rejection of claims 44 under 35 USC 103(a) over United States Patent 1,936,829 (Corson) in view of United States Patent 4,201,648 (Subramanian)

For the reasons stated above, Applicants' amended claim 21 is nonobvious over Corson. Further, Subramanian does not rectify the deficiencies of Corson in that Subramanian does not teach or suggest supplying sulfuric acid at a first pressure exceeding ambient pressure.

Since the cited combination does not teach or suggest Applicants' required limitation of supplying sulfuric acid at a first pressure exceeding ambient pressure, the cited combination does not teach or suggest each and every claim limitation of Applicants' claimed invention. Therefore, Applicants' claim 21 along with all claims dependent thereon are nonobvious over the cited combination.

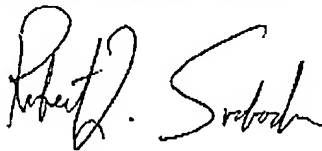
Thus, reconsideration and removal of the rejection under 35 USC 103(a) is respectfully requested.

New Claim

Applicants have added new claim 47, no new matter has been introduced in new claim 47 as support for claim 47 can be found in claim 21 and in Figures 1, 2, or 3 of the Original Specification and in paragraph page 4 paragraph 41 – paragraph 42 of the original specification. Claim 47 includes the limitation "sulfuric acid being continuously cycled through the system" which, along with the limitations described above, is not taught or suggested by the Corson reference. Thus, allowance of the new claim is respectfully requested.

Applicants respectfully request withdrawal of all outstanding rejections and respectfully submit that the application stands in condition for allowance. If the Examiner has any questions or suggestions regarding this amendment, the Examiner is respectfully asked to contact Applicants' representative at the telephone number or email address listed below.

Respectfully submitted,



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